

## Claims

- [c1] 1. An electrochemical cell system, comprising:  
an electrochemical cell stack;  
a phase separation apparatus in fluid communication with the electrochemical cell stack;  
a water discharge in fluid communication with the phase separation apparatus;  
a first flow control device and a second flow control device disposed in fluid communication between the phase separation apparatus and water discharge;  
and  
a control device in operable communication with a sensor, the first flow control device, and the second flow control device.
- [c2] 2. The electrochemical cell system of Claim 1, further comprising a hydrogen separator, wherein the first flow control device and the second flow control device are disposed in fluid communication between the phase separation apparatus and the hydrogen separator.
- [c3] 3. The electrochemical cell system of Claim 2, wherein the sensor is disposed in operable communication with the hydrogen separator.
- [c4] 4. The electrochemical cell system of Claim 2, wherein the sensor is disposed in operable communication between the hydrogen separator and the phase separation apparatus.
- [c5] 5. The electrochemical cell system of Claim 2, wherein the sensor is disposed in operable communication between the hydrogen separator and the first flow control device.
- [c6] 6. The electrochemical cell system of Claim 1, wherein the sensor is disposed in fluid communication between the hydrogen separator and the water discharge.
- [c7] 7. The electrochemical cell system of Claim 6, wherein the sensor is disposed in operable communication between the second flow control device and hydrogen separator.
- [c8] 8. The electrolysis cell system of Claim 1, wherein the control device initiates

actuation of at least one of the flow control device and the second flow control device if a pressure signal from the sensor is above a first selected amount or below a second selected amount.

- [c9] 9.The electrochemical cell system of Claim 1, wherein the sensor is selected from the group consisting of a pressure sensor, an output sensor, a flow rate sensor, a mass flow sensor, and combinations comprising at least one of the foregoing sensors.
- [c10] 10.The electrochemical cell system of Claim 1, wherein the first flow control device and the second flow control device comprise valves.
- [c11] 11.The electrochemical cell system of Claim 1, wherein the sensor is disposed in operable communication between the phase separation apparatus and the first flow control device, and further comprising a additional sensors disposed in operable communication between the first flow control device and the second flow control device, and between the second flow control device and the water discharge, wherein the additional sensors are in operable communication with the control device.
- [c12] 12.The electrochemical cell system of Claim 1, further comprising a third flow control device disposed in fluid communication between a hydrogen separator and the water discharge, wherein the third flow control device is in operable communication with the control device.
- [c13] 13.The electrochemical cell system of Claim 12, further comprising a fourth flow control device disposed in fluid communication between the third flow control device and the water discharge, wherein the fourth flow control device is in operable communication with the control device.
- [c14] 14.A pressure regulating system for a hydrogen gas generator system, comprising:  
means for generating hydrogen;  
means for sensing a liquid level within a phase separation apparatus disposed in fluid communication with the means for generating hydrogen;  
means for regulating the liquid level within the phase separation apparatus

disposed in operable communication with the phase separation apparatus; and means for maintaining a system pressure in the hydrogen gas generator system within a selected range upon release of liquid from the phase separation apparatus.

[c15] 15. The pressure regulating system of Claim 14, further comprising a means for receiving separated water disposed in fluid communication with the phase separation apparatus, wherein the means for maintaining the pressure regulating further comprises a first flow control device and a second flow control device disposed in operable communication with the phase separation apparatus, and between the phase separation apparatus and the means for receiving separated water.

[c16] 16. The pressure regulating system of Claim 15, further comprising a means for determining the system pressure disposed in operable communication with the hydrogen generating system, the means for maintaining the pressure.

[c17] 17. A method for regulating pressure in an electrolysis cell system, comprising: directing a fluid stream from an electrolysis cell to a hydrogen/water phase separation apparatus; sensing a liquid level within the hydrogen/water phase separation apparatus; regulating the liquid level within the hydrogen/water phase separation apparatus by at least one of introducing and releasing liquid from the hydrogen/water phase separation apparatus based upon the liquid level; monitoring electrolysis cell system pressure; regulating electrolysis cell system pressure with a first flow control device and a second flow control device disposed in fluid communication between the hydrogen/water phase separation apparatus and a water discharge, and in operable communication with a control device; and maintaining the electrolysis cell system pressure within a selected range.

[c18] 18. The method of Claim 17, wherein maintaining the electrolysis cell system pressure further comprises at least one of opening the first flow control valve, opening the second flow control valve.

[c19] 19. The method of Claim 17, wherein the first flow control valve and the second flow control valve are opened sequentially.

[c20] 20. A computer data signal, comprising:  
instructions for causing a computer to implement a method for operating a power system, the method comprising:  
sensing a liquid level within a hydrogen/water phase separation apparatus;  
regulating the liquid level within the hydrogen/water phase separation apparatus by at least one of introducing and releasing liquid from the hydrogen/water phase separation apparatus based upon the liquid level;  
monitoring electrolysis cell system pressure;  
regulating electrolysis cell system pressure with a first flow control device and a second flow control device disposed in fluid communication between the hydrogen/water phase separation apparatus and a water discharge, and in operable communication with a control device; and  
maintaining the electrolysis cell system pressure within a selected range.